Using Threat Analysis To Design Secure Systems

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Agenda

- A dose of reality
- A threat modeling strategy
  - STRIDE
- A short example
- Best practices

Reality!

- All products are susceptible to attack
- Vulnerabilities lead to threats, which lead to attacks
- Simply adding 'security' doesn't solve anything

Vulnerability


Mitigation Techniques
Patrolled!
ggrr!

Building Secure Systems

"You cannot build secure systems
unless you know the threats
to which your are susceptible"

A Threat Modeling Strategy

- **Brainstorm about:**
  - Which assets need protecting?
  - What value are the assets?
  - What threats are the assets susceptible to?
  - Prioritize threats
  - How do you mitigate the threats?

STRIDE

- S - Spoofing user identity
- T - Tampering with data
- R - Reputability
- I - Information disclosure
- D - Denial of service
- E - Elevation of privilege

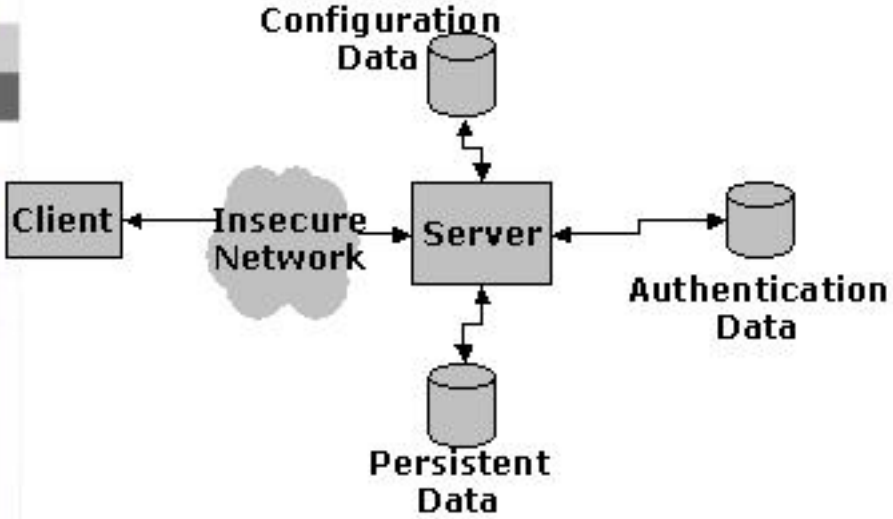
Assets

- Configuration data
- Authentication data
- Persistent data
- Data 'on the wire'
- State Data
- Temporary Data

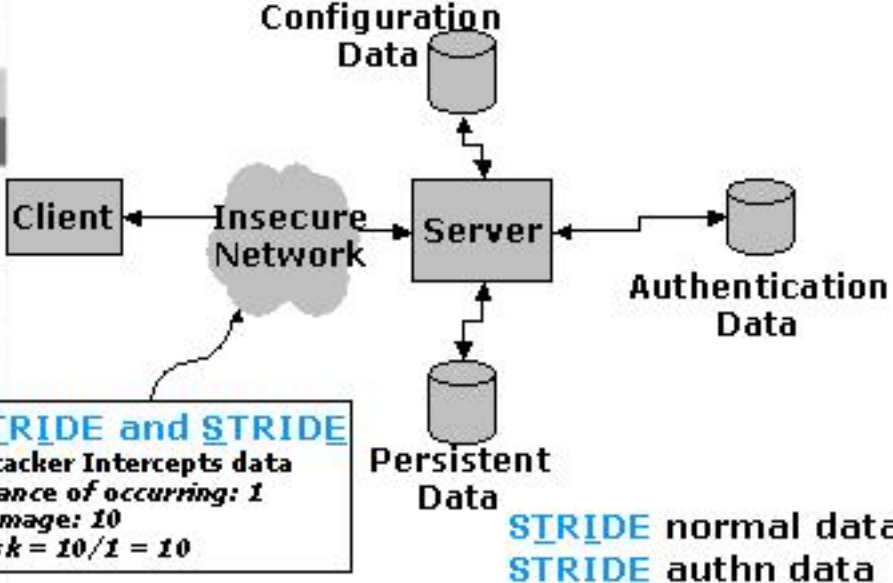
Prioritization

- Chance of attack occurring
  - 1 = high, 10 = low
  - How much effort/cost/time is required to mount the attack?
- What's the cost/damage if attack occurs?
  - 1 = little, 10 = massive
- Risk = Damage/Chance
- Do high-risk items first

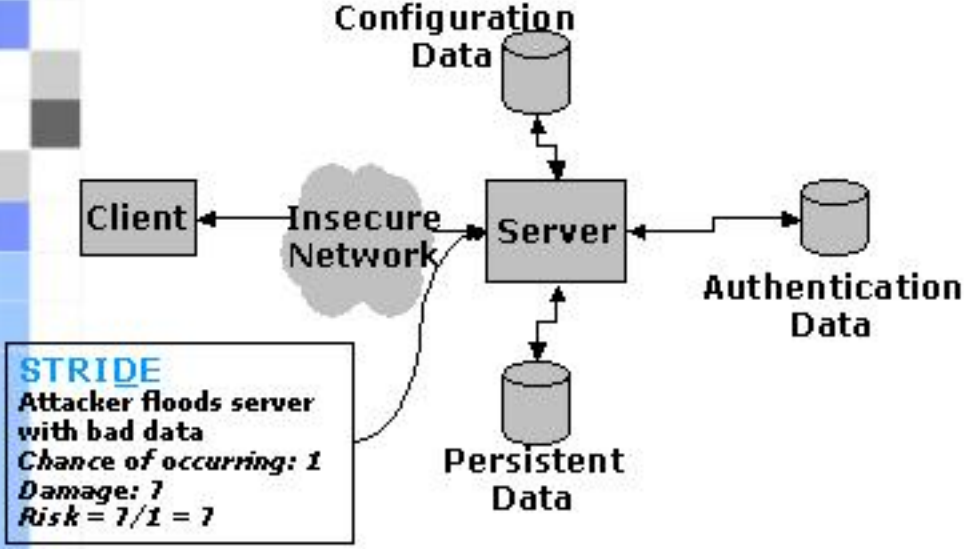
A Server Example 1



A Server Example 2

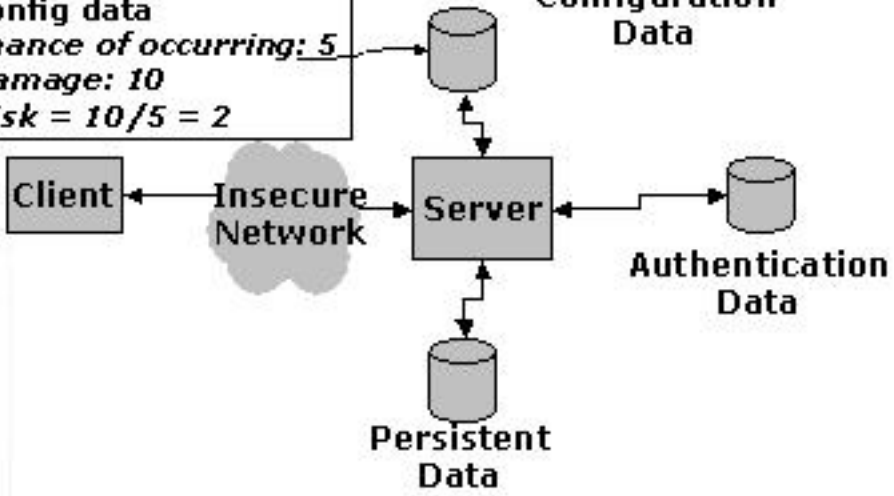


A Server Example 3

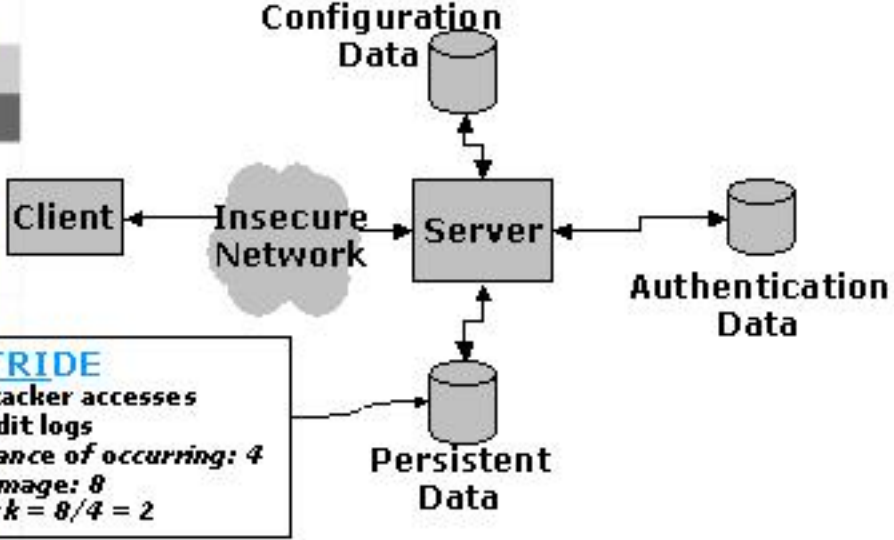


A Server Example 4

STRIDE
Attacker accesses config data
Chance of occurring: 5
Damage: 10
Risk = 10/5 = 2



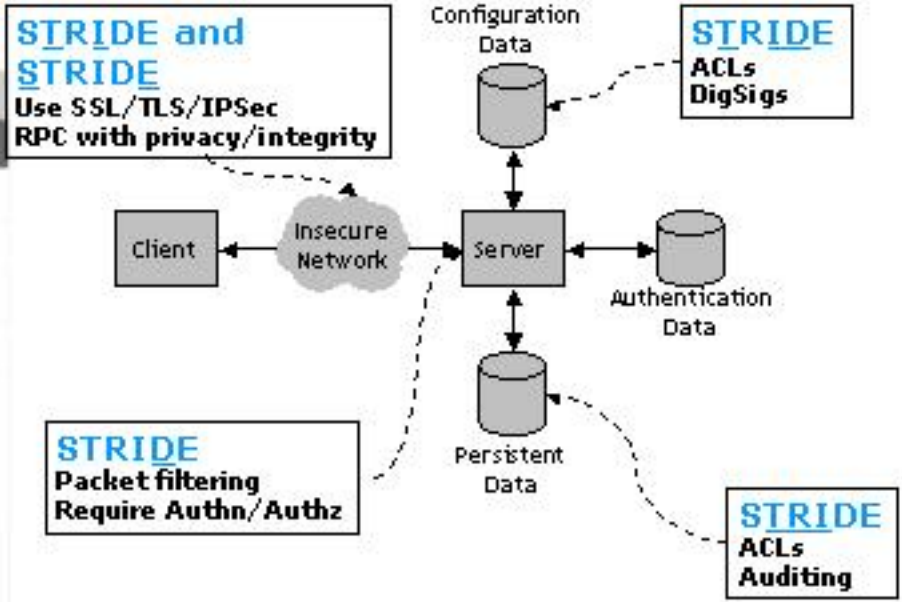
A Server Example 5



Mitigation Techniques

- S – strong authentication, don't store secrets
- T – hashes, digsigs, tamper resistant protocols
- R – digsigs, timestamps, secure logging
- I – strong access control mechanisms, encryption, don't store secrets
- D – filtering, throttling, QoS
- E – Run with least privilege

A Server Example 6



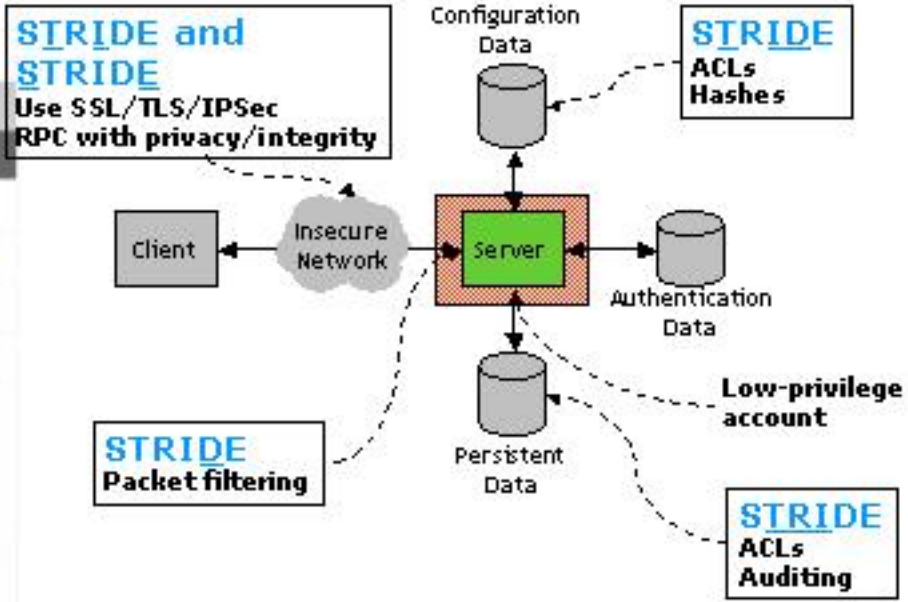
Development Best Practices

- Check for buffer overflows
- Don't run as Localsystem
- Do not require admin or power user
- Use negotiate, not NTLM SSP
- Request privacy/integrity on RPC/COM calls
- Use/robust MIDL flag

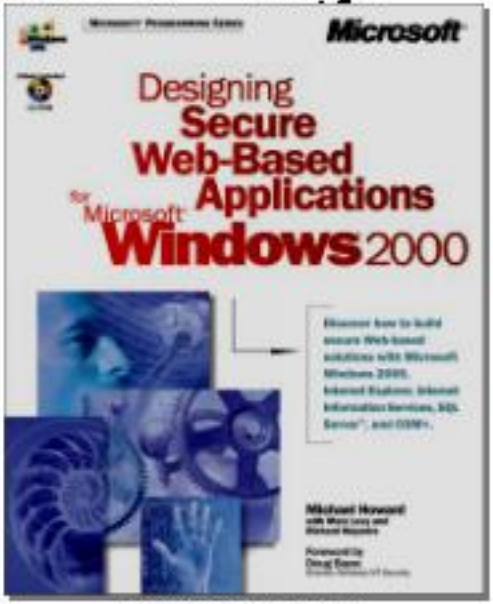
Web Development Best Practices

- Parse all user input using RegExp
  - http://www.microsoft.com/technet/security/crssite.asp
- Deny use of '..' in a filename
- Don't return physical paths to user

A Server Example 7



Shameless Plug!



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